WHAT I CLAIM IS:

1. A wedge loading mechanism for a planetary traction drive comprising a roller positioned between and in frictional contact with two raceways that form a convergent wedge such as to communicate motion between the two raceways, wherein the roller includes a flexible mounting that generates a difference between an effective supporting stiffness K_S of the roller and an effective contact stiffness K_R at a contact point A where the roller contacts at one of the two raceways and at a contact point B where the roller contacts the other of the two raceways.

2. The wedge loading mechanism of Claim 1 further comprising a loading roller ring and wherein the flexible mounting comprises a supporting shaft, an elastic insert, and a bearing.

3. The wedge loading mechanism of Claim 2 where, as the loading roller ring is driven by friction forces *F* at contact points *A* and *B* into a converged wedge between the two raceways, a normal contact force *N* and a supporting force F_0 are characterized by:

$$F_0 = K_S \cdot l$$

$$N = K_R \cdot l \sin\frac{\delta}{2} = K_R \int_0^l \sin\frac{\delta}{2}\, dl$$

where l is the distance that the center of loading roller ring moves within the converged wedge in response to the friction forces at contact points *A* and *B*, and δ is the wedge angle between the two raceways measured at the contact points.

4. The wedge loading mechanism of Claim 3 where an operating friction coefficient at a contact is μ_0 and a supporting force under static equilibrium conditions is characterized by:

$$\frac{F_0}{2N} = \mu_o \cdot \cos\frac{\delta}{2} - \sin\frac{\delta}{2}$$

5. The wedge loading mechanism of Claim 4 wherein under static equilibrium conditions an effective stiffness ratio between K_S and K_R as characterized by:

$$\frac{K_S}{K_R} = 2\left(\mu_0 \cos\frac{\delta}{2} - \sin\frac{\delta}{2}\right)\sin\frac{\delta^*}{2} \leq \mu \sin\delta - 2\sin^2\left(\frac{\delta}{2}\right)$$

where μ is the maximum available friction coefficient at the contacts.

6. The wedge loading mechanism of Claim 5 where in the situation where the stiffness ratio has a negative value, there is a direction change in the force F_0 indicating the supporting shaft is pushing the loading roller ring into the converged wedge.

7. The wedge loading mechanism of Claim 6 wherein wedge loading mechanism incorporated into the planetary traction drive can be operated under any small wedge angle δ while still having the traction drive being operated at or close to the maximum available friction coefficient μ so long as the stiffness ratio is appropriately chosen, as characterized by:

$$\frac{K_S}{K_R} = 2\left(\mu_0 \cos\frac{\delta}{2} - \sin\frac{\delta}{2}\right)\sin\frac{\delta^*}{2} \leq \mu \sin\delta - 2\sin^2\left(\frac{\delta}{2}\right)$$

8. A wedge loading mechanism for a planetary traction drive comprising a planetary roller positioned between and in frictional contact with an outer ring member and a sun roller member of a planetary traction drive such as to communicate rotational motion between the outer ring member and the sun roller member, wherein the planetary roller includes means for flexibly mounting a support shaft within the planetary roller such that said means generates an effective supporting stiffness K_S of the planetary roller and an effective contact stiffness K_R at a contact point A where the planetary roller contacts the sun roller member and at a contact point B where the planetary roller contacts the outer ring member, wherein the ratio of K_S to K_R results in a more efficient transmission of power and torque between the two raceways than other ratios of K_S to K_R.

9. The wedge loading mechanism of Claim 8 wherein the said means for flexibly mounting a support shaft within the planetary roller comprises a elastic insert and a bearing, wherein the supporting shaft is located in the elastic insert and the elastic insert is located in the bearing.

10. A method of transmitting rotational motion and torque within a traction drive device comprising the steps of:

manufacturing a wedge loading mechanism having a flexibly mounted supporting shaft;

installing the wedge loading mechanism into a traction device having a sun roller member into an outer ring member such that the sun roller member is eccentric to the outer ring member and a wedge gap is formed between the sun roller member and the outer ring

member and the wedge loading mechanism is located within the wedge gap;

installing the planetary roller member into the wedge gap such that the planetary roller member is between and in contact with the sun roller member and the outer ring member; and

wedging the wedge loading mechanism between the outer ring member and the sun roller member by rotation of at least one of either the sun roller member or the outer ring member such that rotation and torque is transmitted from the outer ring member and the sun roller member.